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Docket No. 520.43257X00  
Serial No. 10/699,737  
Preliminary Amendment**REMARKS****I. Introduction**

By the present Amendment, claims 1, 5, 7, 8, and 10 have been amended. Claims 14-16 are newly presented for considerations. Accordingly, claims 1-16 are now pending in the application. Claims 1, 10, and 16 are independent.

**II. Office Action Summary**

In the Office Action of May 1, 2006, claims 1-13 were rejected under 35 U.S.C. §112, second paragraph. Claims 1-13 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent 5,942,342 issued to Hikosaka et al. ("Hikosaka"). These rejections are respectfully traversed.

**III. Rejections Under 35 USC §112**

Claims 1-13 were rejected under 35 U.S.C. §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Regarding this rejection, the Office Action indicates that claims 1 and 10 recite the transitional phrase "consisting of", which is closed to additional elements. However, the claim goes on to recite that the domain control layer "includes at least" an anti-ferromagnetic layer, which is improper since it is not clear what is to be excluded and what is to be allowed.

Applicants have reviewed the claims and made appropriate amendments to correct the language cited in the Office Action. Specifically, claims 1 and 10 have been amended, in part, to clarify that the domain control layer is closed to additional elements, as suggested in the Office Action.

Withdrawal of this rejection is therefore respectfully requested.

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#### **IV. Rejections Under 35 USC §102**

Claims 1-13 were rejected under 35 U.S.C. §102(b) as being anticipated by Hikosaka. Regarding this rejection, the Office Action principally asserts that the amended claim language allows the domain control layer to be open to an infinite number of layers provided that at least one is an anti-ferromagnetic layer. Further, the Office Action indicates that the claims are not limited to three layers, as argued, but open to an infinite number of layers provided the first and last layers are soft magnetic layers. The Office Action further provides suggestions for amending the claims to the structure argued in the previous response.

Applicants have reviewed the suggestions provided in the Office Action and made appropriate amendments to reflect the structures believed to be patentable. Specifically, independent claim 1 has been amended to define a perpendicular magnetic recording medium that includes, in part, a first soft magnetic layer, an anti-ferromagnetic layer, and a second soft magnetic layer. Claims 5, 8, and 10 have been amended to define a perpendicular magnetic recording medium having a ferromagnetic layer formed either between the first soft magnetic layer and the anti-ferromagnetic layer, or between the second soft magnetic layer and the anti-ferromagnetic layer. Claim 7 has been amended to recite a third soft magnetic layer (seed layer) formed between the first soft magnetic layer and the anti-ferromagnetic layer. Claims 14-16 are newly presented and recite, in part, a ferromagnetic layer formed between the first soft magnetic layer and the anti-ferromagnetic layer, as well as a ferromagnetic layer formed between the second soft magnetic layer and the anti-ferromagnetic layer.

According to claim 1 the perpendicular magnetic recording medium has a soft magnetic underlayer and a perpendicular recording layer which are deposited over a

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substrate and a specific order, i.e., the magnetic underlayer being deposited before the perpendicular recording layer. The soft magnetic layer consists of a first soft magnetic material, a domain control layer which consists of an anti-ferromagnetic layer, and a second soft magnetic layer. Additionally, these three layers are deposited in this specific order relative to the location of the substrate. According to the invention of claim 1, the energy of the exchange bias field (Hex2) which is applied to the second soft magnetic layer is larger than the energy of the exchange bias field (Hex1) which is applied to the first soft magnetic layer. Furthermore, when a magnetic field is applied in a radial direction of the substrate, the resultant magnetization curve of the soft magnetic underlayer exhibits a magnetization reversal slope at a shift toward a positive direction of energy of the magnetic field and coercivity ( $H_c$ ) of the soft magnetic layer that is smaller than the energy of an exchange bias field Hex which corresponds to the shift quantity. As clarified by the present amendments, these features do not appear to be disclosed by the art of record.

It is therefore respectfully submitted that independent claim 1 is allowable over the art of record.

Claims 2-9 and 13-15 depend, either directly or indirectly, from independent claim 1, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 1.

In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

Independent claim 10 has been amended to better define the arrangement of layers on the substrate. Similar to independent claim 1, independent claim 10 provides only two soft magnetic layers that are disposed in a specific order from the

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substrate. Claim 10 also provides two ferromagnetic layers, one on either side of the anti-ferromagnetic layer. Additionally, the energy of the exchange bias field (Hex2) which is applied to the second magnetic layer is larger than the energy of the exchange bias field (Hex1) which is applied to the first soft magnetic layer. Additionally, the applied references do not appear to disclose the feature of the second exchange bias field (Hex2) being greater than that of the first exchange bias field (Hex1) within a magnetic recording medium which contains only two soft magnetic layers. Again, these particular features do not appear to be disclosed or suggested by the art of record.

It is therefore respectfully submitted that independent claim 10 is allowable over the art of record.

Claims 11-13 depend from independent claim 10, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 10. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

Independent claim 16 is newly presented and defines features that are similar to those recited in independent claim 10.

It is therefore respectfully submitted that independent claim 16 is allowable over the art of record.

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**VI. Conclusion**

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, a Notice of Allowance is believed in order, and courteously solicited.


If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

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**AUTHORIZATION**

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2136 (Case: 520.43257X00).

Respectfully submitted,  
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